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Adaptation of health systems to climate-related migration in Sub-Saharan Africa: Closing the gap

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Health systems worldwide need to be adapted to cope with growing numbers of migrants and to climate-exacerbated morbidity. Heatwaves, water stress, desertification, flooding, and sea level rise are environmental stressors that increase morbidity, mortality, and poor mental health in Sub-Saharan Africa. While most migration is intra-African, climate change is also affecting migration patterns outside the continent. To tackle the health challenges induced by these events, such as infectious diseases and malnutrition, health care providers in Sub-Saharan Africa and in receiving countries in Europe must adapt their systems to provide appropriate health services to these communities. While health systems differ greatly across the global north and south, adaptation measures are similar and should be integrated. We present recommendations for adaptation of health systems to climate-related migration, including strengthening health systems, providing access to healthcare, culturally-appropriate services, policy-oriented research and training, and inter-sectoral collaboration.

1. Introduction

According to World Health Organization (WHO) estimates, there are approximately one billion migrants worldwide today, about 22% of whom are international and the rest are internal (World Health Organization & World Meteorological Organization, 2012). The World Bank estimates that by 2050 there will be 86 million internal climate migrants in Sub-Saharan Africa alone (Rigaud et al., 2018). Population movements on the African continent are hardly new, but the challenges of climate change have resulted in growing numbers of refuge seekers (World Health Organization and World Meteorological Organization, 2012). Environmental vulnerability is especially important in the African case because countries across the continent are expected to face massive climate change effects and the local health systems are ill-equipped to cope (Niang et al., 2014).

Complex political and socio-economic settings in the continent are the root drivers of vulnerability to environmental change, but environmental changes are also a contributing factor to political and socio-economic instability. Furthermore, climate-exacerbated migration is expected to increase (Costello et al., 2009; McMichael et al., 2012). Migration should be considered as a socio-ecological determinant that affects migrants' health. Legal aspects, poverty, and discrimination in receiving countries all impact migrants' health. While some of the political and economic barriers migrants face are indeed similar to those faced by other low-income communities, many stem from migrants' explicit exclusion from the resources to which citizens in host countries are entitled. In other words, their status as migrants unambiguously places them at a disadvantage from the very moment of their arrival, and in the case of irregular migration across borders, this disadvantage is exacerbated every time they must decide whether to interact with a system that may deport them (McMichael et al., 2012).

2. Climate-exacerbated morbidity in Sub-Saharan Africa

The main climate-related health risks in Africa will result from a projected increase in temperatures alongside increased frequency, duration, and intensity of heat waves (Russo et al., 2016). In Sub-Saharan Africa, heat waves are associated with cholera outbreaks, cardiovascular diseases, and all-cause death (Amegah et al., 2016; Mendelsohn and Dawson, 2008). Infectious diseases associated with increase in mean temperatures are vector-borne and mosquito-borne diseases, such as malaria (Dasgupta, 2018; Wu et al., 2016). According to the Intergovernmental Panel on Climate Change (IPCC), high water stress is a continuous burden for 200 million people in Africa, while many more lack access to clean drinking water and sanitation (Niang et al., 2014). Runoff water, groundwater, and river basins will be

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impacted, as well as water infrastructure (Connolly et al., 2018; Conway et al., 2015). Due to these climate factors, the rate of African agriculture production is expected to decrease by 18.6% during the coming half century (Cline, 2008). Droughts are associated with malnutrition in children in Africa (Bauer and Mburu, 2017). Water insecurity will also increase the likelihood of water-borne infectious diseases and insect-borne diseases (African Development Bank and African Development Fund, 2013; Costello et al., 2009).

Desertification is a multifaceted environmental challenge in drylands, estimated to impact about 46% of Africa's territory and expected to significantly worsen, leading to a further increase in surface temperature, solar radiation, dust storms, and decrease in soil fertility and biomass (Prăvălie, 2016). Since a significant proportion of Sub-Saharan Africa's population relies on traditional biomass for cooking, energy poverty is expected to worsen. Food insecurity increases the chances of developing acute malnutrition in children, low birth weights, micronutrient deficiency diseases, pellagra, scurvy, and anemia (McMichael et al., 2012). Coastal populations, including infrastructure and economies of Sub-Saharan Africa, are vulnerable to inundation and flooding, coastal erosion, shoreline relocation, saltwater intrusion or tsunamis (Neumann et al., 2015). The Food and Agriculture Organization (FAO) estimated that fish is the main source of animal protein for approximately 200 million people across Africa (Kolding et al., 2016). Alongside overfishing and water pollution that have already driven wild capture fisheries to their production limit, food security of millions is at stake.

Mental health is another, less discussed, effect of climate change. The intensity and frequency of extreme climatic events can cause mental health disorders including posttraumatic stress disorder, depressive disorders, anxiety, and other serious conditions (Berry et al., 2018; Hayes et al., 2018) In addition, due to their forced displacement, many climate migrants can experience negative consequences on their sense of identity and belonging, factors that can intensify psychosocial distress (McMichael et al., 2010). Health systems should be adapted to meet the increased demand for mental health services relating to climate change. Healthcare facilities in Arusha (Tanzania), for example, provide free psychiatric and psychological counseling to underprivileged populations (Heaney and Winter 2016). While migration is already understood as a socio-ecological determinant with potential harmful effects on migrants' health (Fleischman et al., 2015), the direct and indirect effects of climate change on health should also be analyzed (Berry et al., 2018). See Fig. 1 for a summary of main climate-related environmental stressors and the pathways to health impacts.

3. The current state of health systems in Sub-Saharan Africa

Health systems in Sub-Saharan Africa already suffer from acute shortages in resources, both material and human (World Health Organization, 2007), and are not prepared for the burden of climate migration. While not a monolithic entity, health systems in many countries across the continent have been weakened by years of underinvestment, international debt, and structural adjustment programs. In many cases, this has led to the privatization of national services and reductions in public expenditures on education, infrastructure, and health (Gershman and Irwin, 2000; Pfeiffer and Chapman, 2010). Consequently, poorly resourced health systems in many African countries have been coping not only with a massive HIV/AIDS epidemic, as well as with high rates of other infectious diseases, but are also experiencing an epidemiological transition and a rise in rates of noncommunicable diseases, resulting in an epidemiological 'double-burden' of infectious and chronic diseases (Young et al., 2009).

Health services in many Sub-Saharan African countries are provided by fragmented systems in which NGOs, private providers, humanitarian organizations, and state institutions provide limited, and often uncoordinated, health care (McIntyre et al., 2008). Health expenditure rates in many African countries are some of the lowest in the world (World Bank, 2017). The mounting challenges created by climate change, and related migration patterns across the continent, exacerbate existing stressors affecting health systems. Moreover, refugees who are secondary migrants (arrive from a country other than their country of birth) are at greater risk as their health is already poorer; those from less-developed countries report higher distress than the native-born and their primary-immigrant counterparts (Montanzer, 2018).

4. Migrants and health systems in European destinations

While the majority of African climate migrants remain in Africa, substantial numbers reach a European destination. The infrastructure and resources of health systems in receiving countries in Europe are more abundant compared to those in Africa. However, with migrants accounting for nearly 9.6% of the total population in European countries, their health systems face similar challenges in providing health care for an increasing number of migrants and the additional expected increase in multifactorial climate-exacerbated morbidity. Although climate change has been recognized as an important factor affecting migration, an integrated European level strategy is not fully in place to respond to these emerging challenges.

5. Adaptation of health systems for climate-exacerbated morbidity of migrants

Although health systems in Africa and in European destination countries are providing short-term responses to the symptoms mentioned in our brief literature review, many are ill equipped to address them comprehensively. In many countries, existing access is fragmentary, providing mainly emergency services and public health related services such as immunization and mother and child preventive services. Multicultural services for migrants are significantly lacking, specifically relating to language, health care coverage, and social exclusion (Priebe et al., 2011) A long-term strategy is needed to plan future health systems response, based on collaboration among government sectors and forecast of climate-scenarios, population movement, and resettlement (Mayhew and Hanefeld, 2014).

Examples of good practice already exist and certain countries in Europe are responding to migrants' health needs, developing health surveillance and responses, and providing culturally adequate health assistance (World Health Organization, 2016a). For example, in Germany asylum-seekers are entitled to basic health services upon their arrival and to health care benefits equal to the health care benefits of German citizens after fifteen months (Bauhoff and Göpffarth, 2018). Translation services are also being developed, such as web-based translation programs and multilingual staff members (Borgschulte et al., 2018). Another example is Turkey where health services are provided to Syrian refugees and efforts are being made to implement health services in centers where primarily Syrian staff serve their own people (World Bank Group, 2015).

In primarily rural areas in Africa, electronic devices are used to make health care more accessible. Mobile phones are frequently used by health practitioners to gather health data and for complex medical practices such as surgery (World Health Organization, 2016b). Despite cases of good practice at the local or national level, there is still an institutional science-policy gap between environmental sciences and climate projections, and adaptation of health systems. A willingness to recognize migration as a socio-ecological determinant of health, and more pointedly as a source of health-related structural vulnerability, can be invaluable to creating national and international frameworks for action.

6. Recommendations

In the current state of affairs, government and academic sectors and disciplines work in silos. There is no collaboration among the health,

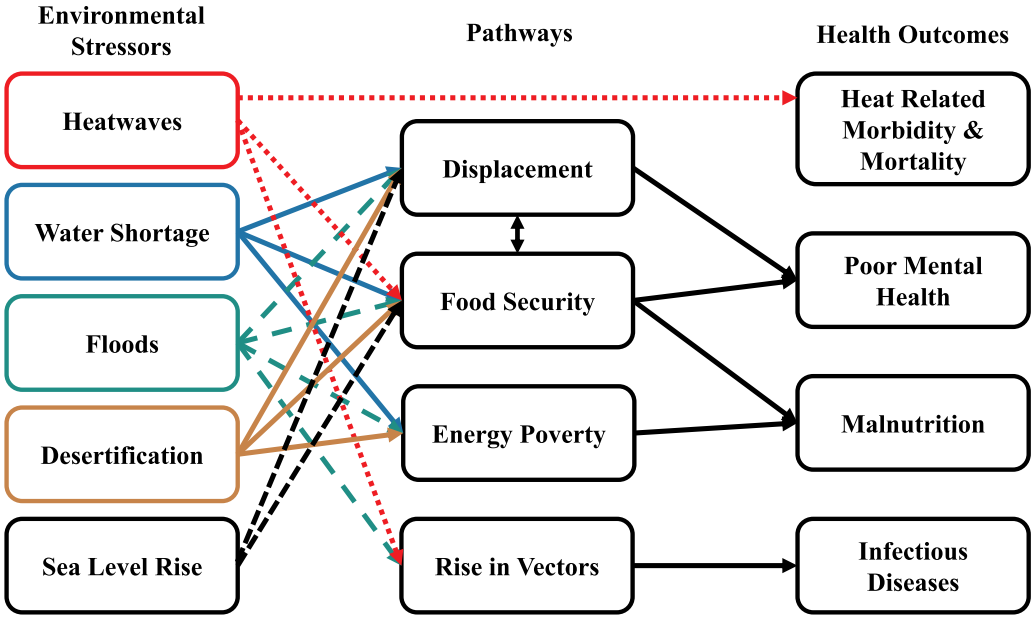

Fig. 1. Climate-related environmental stressors and the main pathways to health outcomes in Sub-Saharan Africa.

environment, welfare, education, and home security sectors to develop policy and prepare for the climate-exacerbated crisis. In academia, the disciplines of migration and health, health systems strengthening, Africa studies, and climate change and health are all concerned with this trend, but academic programs, research projects, and conferences remain largely disciplinary. To close the institutional gap of adaptation to climate-exacerbated migration and morbidity, we propose the following recommendations:

1. Most climate migration is intra-African. **The international community should support local efforts to strengthen health systems and increase the health expenditure in Africa.**
2. Health systems should work with scientists to design and prioritize **policy-oriented research**, including: strengthening and evaluating adaptation of health systems in Africa; mobile and field solutions for diagnosis and treatment; developing inexpensive prevention of environmental stressors such as water filters, water carriers, and renewable energy for cooking; better understanding of causal pathways; and participatory research involving migrants to develop effective interventions.
3. **Train health professionals** and students in schools of medicine and public health in adaptation of health systems in the global south and north to current and projected climate-exacerbated morbidity, changes in infectious diseases trends, and providing mental health care for migrants.
4. **Research morbidity pathways and design ecosystem-based interventions** to reduce climate-exacerbated morbidity in Africa.
5. **Coordinate care along the migration route and across sectors.** Humanitarian aid should be integrated with existing government health systems and through local health care providers with a long-term approach, not merely in emergency relief clusters, to overcome the limits of existing fragmented services; health system, medical, public health, ecology, and veterinary professionals should collaborate.
6. Health systems internationally should provide migrants (and residents) with **access to comprehensive health care.** Effective and efficient means to develop more comprehensive services include: a shift from hospitals to more accessible clinics in the community; migrant-oriented clinical guidelines; and use of cost-effective technological means such as eHealth (electronic health) and mHealth (mobile health), including mobile phones for communication, data and information provision, telemedicine, and telepsychiatry.
7. Health systems should engage with the diverse and dynamic migrant communities and ensure their representation in migrants' health governance, provision of **culturally appropriate services** in both language and norm, and the inclusion of migrants in service provision as professionals and community health workers. Health systems should take part in influencing public perception, including the need to fight structural racism and support mechanisms of inclusion for migrants.

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